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ABSTRACT

The report summarizes findings and recommendations of a Virginia Department of Education Task Force concerning the establishment of comprehensive hearing screening programs in Virginia's public schools. Special emphasis was on findings of Project HEAR (Hearing Education and Resources) which found that mass hearing screenings could be conducted in an average of 2 minutes per child and at an average cost of $1.24 per screening, and that 11% of primary grade children were identified as "at risk" for possible hearing loss. Fifteen conclusions of the Task Force are listed followed by 10 recommendations including: (1) a statewide comprehensive hearing conservation program should be established; (2) a person at each local education agency should be identified as responsible for coordination of a comprehensive hearing screening program; (3) the state should provide start-up funds to all local education agencies to initiate a comprehensive screening program; (4) specific identified groups should receive puretone screening and tympanometry screening; and (5) an inservice training program should be included in the screening program. Also provided are criteria for rescreening and referral and an outline for a classroom teacher inservice program addressing hearing, hearing loss, hearing screening, and medical and educational management of hearing loss. (DB)

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Comprehensive Public School Hearing Health Plan: Screening, Follow-Up, Teacher Inservice

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

Paper presented at the Annual Convention of the
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The 1988 General Assembly passed Senate Joint Resolution 5, directing the Department of Education to study the feasibility of establishing comprehensive hearing screening programs in Virginia's public schools. The Department was directed to base its study upon the successful regional hearing screening program, Project HEAR (Hearing Education and Resources).

This study looked to a number of sources: current state guidelines and regulations, current state practices with regard to hearing screening, comprehensive hearing conservation programs which have been established both in Virginia and other states, and the literature which connects the occurrence of recurrent otitis media to language, learning and behavior difficulties in children. The following statements summarize the findings and conclusions reached by the Task Force upon which their recommendations are based.

1. The purpose of a screening program is to identify individuals who are likely to have a disorder. Puretone screening and tympanometric screening are used in a hearing screening program to identify the possible presence of different types of hearing, both of which require follow-up to assess medical status and determine if educational performance is affected.

2. The results of Project HEAR (Hearing Education and Resources) indicated that: (1) Mass hearing screenings can be conducted on children in grades K through 3 at an average cost of $1.24 per screening; (2) hearing screenings can be completed in two minutes per child; (3) results of the hearing screenings revealed that 11% of the children tested failed 2 screenings and were identified as being "at risk" for possible hearing loss; and (4) a significant number of students (5%) was found to be in need of medical attention following the physician's screening.

3. Hearing loss is known to affect language development and academic performance. The earliest possible identification and intervention is necessary to minimize the effects.

4. Recurrent otitis media has been found to negatively impact upon language development, academic achievement and behavior in a high number of children. Prevention of recurrent otitis media can play an important part in

the prevention of language and academic problems in children.

5. A high percentage of students enrolled in handicapped programs for the learning disabled have a history of otitis media.

6. Many school divisions in Virginia are not complying with the requirement that the hearing of all students referred to special education be assessed.

7. Initial school hearing testing is dome currently by either nurses, speech-language pathologists, or combined efforts of these professionals in most school systems. Audiologists are not generally involved in mass screening of hearing.

8. Speech-language-pathologists report spending anywhere from several days to an entire month completing hearing screenings. This represents time lost from providing therapeutic services. Students identified as speech-language impaired with an IEP cannot be denied services while a hearing screening program is completed.

9. A program which utilizes both puretone and tympanometric screening is needed in order to identify both children with sensorineural hearing loss and those with fluctuation conductive hearing loss accompanied by middle ear abnormalities.

10. The majority of Virginia school divisions do not currently use tympanometry as a screening procedure. Most divisions use puretone screening alone or supplement puretone screening with tympanometry when a child fails puretone screening. Used in this manner, tympanometry functions as a second level diagnostic procedure.

11. Most school divisions use 25db as the pass criteria for puretone screening. Such procedures would fail to identify approximately 50 to 70% of the children with abnormal middle ear status. Without identifying the hearing loss the children are "at risk" for experiencing language and learning deficits.

12. Impedance screening, or tympanometry, is a fast, accurate, noninvasive procedure for identifying middle ear disorders.

13. Follow-up procedures are a vital part of any screening program and must be addressed by the designers of the program. No follow-up is mandated by the laws which require mass hearing screening in specified grade levels. The degree of follow-up currently undertaken depends solely on the commitment of the personnel at the local level.

14. Parental, community, and school personnel education are important aspects of a comprehensive hearing health care program. Without cooperation from these areas, medical follow-up and education modifications will not occur, making a program essentially useless.

15. School screening programs should attempt to reach preschool children since (1) early identification of hearing loss is crucial; (2) prevalence of middle ear disorders is greatest among preschoolers; and (3) untreated, early onset recurrent otitis media may have more serious long-term education implications. This can be addressed via community education as part of the Child Find program and screening of all preschool children enrolled in the local division.

The following recommendations are made:

1. A statewide comprehensive hearing conservation program should be established to provide hearing health care services to children served by the school systems of Virginia.

2. A comprehensive hearing conservation program would consist of identification, referral, in-service education for teachers, and involvement of parents and members of the local medical community.

3. It is recommended that a person be identified at the SEA who is responsible for coordinating the statewide program.

4. It is recommended that a person should be identified in each local education agency who is to be responsible for coordination of a comprehensive hearing screening program at the local level. This person should be responsible for execution of the hearing screening, administration of in-service and educational programs, and implementation of referral and follow-up procedures.

5. It is recommended that audiologist, registered nurses and/or speech-language pathologists should be responsible for onsite supervision and execution of puretone and tympanometric screening. These persons must have expertise in the administration and interpretation of puretone and tympanometric screening. The use of speech-language pathologist should not cause cancellation of therapy services for any identified speech-language impaired student. Other staff may be used as needed, following proper training, and with a previously identified specialist on-site.

6. It is recommended that the state provide start-up funds to all local education agencies to initiate a comprehensive hearing screening program.

7. It is recommended that screening should be provided to students as follows:

Puretone Screening
- all students in grades K, 3, 7 and 10
- all new students
- all students referred to the Child Study Committee and/or special education supervisor
- pre-schoolers identified in the Child Find procedures
- any student referred by the teacher
- any student failing tympanometry
- all students failing in precious years

Tympanometry
- all students in grades K-3
- all students referred to the Child Study Committee and/or special education supervisor
- all new students K-3
- any student referred by the teacher
- preschoolers identified in Child Find procedures

- all students receiving special education services
- all students failing in previous years

8. Certain protocols are recommended for screening procedures to insure greatest validity and reliability of screening results.

9. The types of equipment purchased for school screening purposes should meet certain criteria.

10. A two phase in-service training program should be included as part of a comprehensive hearing screening program. Such an in-service program should include (1) training screening participants and (2) informing teachers of the effects of hearing loss on language and learning of the accommodations which can be made to accommodate the hearing loss.

RESCREENING AND REFERRAL CRITERIA

Tympanometric testing is an indirect measure of the mobility of the ear drum. The test can provide three major pieces of useful information relative to the auditory status of a child: it can show how much the ear drum moves, at what point relative to normal air pressure conditions it moves most efficiently, and it can measure the size of the ear canal. These three pieces of information may be described in terms of:

COMPLIANCE: The degree of movement of the ear drum. The movement may be classified as less than optimally mobile (stiff), more mobile than is optimal (flaccid) or within the range of normal mobility.

PRESSURE: The point at which the ear drum moves most efficiently. The point of maximum movement may be classified as being at normal ambient air pressure (normal), at a negative degree of air pressure (negative pressure), or at a point requiring greater air pressure than the surrounding air pressure (positive pressure).

VOLUME: A measure of the size of the cavity which has been sealed off by the ear tip of the tympanometer. The cavity may include the ear canal from probe tip to eardrum, or the earcanal and the middle ear space if the ear drum does not act as a complete seal between the canal and middle ear. The volume may be within a range of normal based on age, or larger than would be expected for a given subject (excessive), or extremely small, suggesting an invalid test.

Rescreening

A child was recommended for rescreening under any of the following conditions:

Compliance:	less than or equal to .2 mmH2O (stiff)
Pressure:	-200 daPa or less (negative pressure) +80 daPa or greater (positive pressure)
Volume:	greater than expected for a child (excessive)

Referral

A child was referred for medical evaluation when any of these conditions were present during both the initial screening and the rescreening. Rescreening was performed after an appropriate interval post initial screening (3-4 weeks optimum, 1 week minimum, 6 week maximum).

CLASSROOM TEACHER INSERVICE

I. Properties of Sound

A. Physical Characteristics of Sound

1. waves
2. vibration
3. frequency
4. intensity

B. Sound measurement

1. the Decibel
2. pitches
3. loudness
4. the audiometer

II. Anatomy and Physiology: How We Hear

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1. structures
2. function

B. The Middle Ear

1. structures
2. function

C. The Inner Ear

1. structures
2. functions

D. The Auditory Nerve and Central Pathways

1. structures

2. functions

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B. Sensorineural Hearing Loss

C. Mixed Hearing Loss

D. Degrees of Hearing Loss

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2. moderate
3. severe
4. profound

E. Implications of Hearing Loss

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2. social
3. vocational
4. psychological

IV. Prevalence of Hearing Loss Among School Children

A. Conductive

B. Sensorineural

V. Otitis Media

A. Definitions of terms

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3. serious otitis
4. otitis media with effusion
5. chronic otitis
6. recurrent otitis
7. persistence otitis
8. PE tubes
9. tympanometry
10. otoscopy
11. middle ear pressure
12. "at risk"

B. Consequences and related literature

1. permanent vs. fluctuating hearing loss
2. physical problems
3. academic problems
4. speech and language problems
5. behavioral problems
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VII. The Hearing Screening Program

A. Goals

1. identification
2. monitoring
3. determination of "at-risk" children

B. Protocols

1. preparation (site and date selection, coordination within individual schools, equipment)
2. test procedures
3. follow-up procedures

C. Referral Procedures

1. referral hierarchy
2. child study

VIII. Tympanometry

A. What is tympanometry?

B. How is a tympanogram obtained?

C. What information is provided by tympanometry?

D. How is that information pertinent to education?

IX. Medical Management: Rationale and Procedures for

A. Monitoring

B. Antibiotic therapy

C. Surgical intervention

X. Educational Management

A. Environmental management

B. Compensatory teaching strategies

C. Behavior management of the otitis prone child

D. Assistive listening devices